

CLAIMS:

1. A signal encoding system (100) comprising:
means (101) for receiving a signal;
a pre-encoder (103) for pre-encoding the signal to generate a pre-encoded
signal;
5 a watermark processing means (109) comprising:
a decoder (111) for decoding the pre-encoded signal to generate a decoded
signal,
a watermark embedder (113) for inserting a watermark in the decoded signal
to generate a watermarked signal,
10 a re-encoder (117) for re-encoding the watermarked signal to generate a
watermarked encoded signal; and
wherein the pre-encoder (103) is operable to generate encoding assistance data and the re-
encoder (117) is operable to re-encode the watermarked signal in response to the encoding
assistance data.
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2. A signal encoding system as claimed in claim 1 wherein the pre-encoder (103)
is operable to include the encoding assistance data in the pre-encoded signal.
3. A signal encoding system as claimed in claim 2 wherein the pre-encoder (103)
20 is operable to include the encoding assistance data in at least one ancillary data section of the
pre-encoded signal.
4. A signal encoding system as claimed in claim 1 further comprising storage
means (105) for storing the pre-encoded signal.
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5. A signal encoding system as claimed in claim 4 wherein the storage means
(105) is operable to store the encoding assistance data.

6. A signal encoding system as claimed in claim 1 wherein the pre-encoder (103) is operable to generate encoding parameters associated with an encoding data rate different than an encoding rate of the pre-encoded signal and to include the encoding parameters in the encoding assistance data.
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7. A signal encoding system as claimed in claim 1 wherein the encoding assistance data comprises encoding quantisation control data
8. A signal encoding system as claimed in claim 1 wherein the encoding
- 10 assistance data comprises encoding scale factor data.
9. A signal encoding system as claimed in claim 8 wherein the encoding scale factor data comprises a scale factor offset associated with a scale factor offset value between a first encoding rate and a second encoding rate.
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10. A signal encoding system as claimed in claim 9 wherein the first encoding rate is an encoding rate of the pre-encoded data signal and the second encoding data rate is an encoding rate of the watermarked encoded signal.
- 20 11. A signal encoding system as claimed in claim 9 wherein the encoding assistance data does not comprise scale factor values.
12. A signal encoding system as claimed in claim 9 wherein the re-encoder is operable to generate the watermarked encoded signal at the second encoding rate by
- 25 determining re-encoding scale factors in response to the scale factor offset and scale factor values associated with the first encoding rate.
13. A signal encoding system as claimed in claim 9 wherein the pre-encoder is operable to replace the scale-factors of the pre-encoded signal by a shifted version of the
- 30 scale-factors of the second encoding rate.
14. A signal encoding system as claimed in claim 1 wherein the encoding assistance data comprises encoding rate independent encoding parameters that are substantially independent of the encoding rate.

15. A signal encoding system as claimed in claim 1 wherein the encoding assistance data comprises a first encoding parameter associated with a first encoding rate, and the re-encoder comprises means for determining a first corresponding encoding parameter
5 associated with a second encoding rate in response to the first encoding parameter.

16. A signal encoding system as claimed in claim 1 wherein the encoding assistance data comprises perceptual model data.

10 17. A signal encoding system as claimed in claim 1 wherein the re-encoder (117) is operable to operate frame aligned with the pre-encoder (103).

18. A signal encoding system as claimed in claim 1 wherein the signal is an audio signal.
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19. A signal encoding system as claimed in claim 18 wherein the pre-encoded signal is pre-encoded in accordance with an MPEG audio compression standard.

20. A signal encoding system as claimed in claim 1 wherein the signal is a video signal.
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21. A signal distribution system comprising a signal encoding system as claimed in claim 4 and wherein the pre-encoder (103) is operable to pre-encode a multiplicity of signals; the storage means (105) is operable to store the multiplicity of signals and the
25 watermark processing means (109) is operable to individually embed a watermark in a plurality of signals, and further comprising means (119) for distributing the plurality of signals.

22. A method of encoding a signal comprising the steps of:
30 receiving a signal;
pre-encoding the signal to generate a pre-encoded signal;
generate encoding assistance data in association with the pre-encoding;
decoding the pre-encoded signal to generate a decoded signal;

inserting a watermark in the decoded signal to generate a watermarked signal;
and

re-encoding the watermarked signal to generate a watermarked encoded signal
in response to the encoding assistance data.

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23. A signal encoding system (100) comprising:
means (101) for receiving a signal;
a pre-encoder (103) for pre-encoding the signal to generate a pre-encoded
signal at a first encoding rate and operable to generate encoding assistance data comprising
10 scale factor offset data indicative of an association between at least one scale factor
associated with the first encoding rate and at least one scale factor associated with a second
encoding rate different than the first encoding rate; and
a re-encoder (117) operable to re-encode the pre-encoded signal at the second encoding rate
in response to the scale factor offset data of the encoding assistance data.

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24. A signal encoding system as claimed in claim 23 wherein the pre-encoder
(103) is operable to include the encoding assistance data in the pre-encoded signal.

25. A signal encoding system as claimed in claim 23 wherein the pre-encoder is
20 operable to replace the scale-factors of the pre-encoded signal by a shifted version of the
scale-factors of the second encoding rate

26. A method of encoding a signal comprising the steps of:
receiving a signal;

25 pre-encoding the signal to generate a pre-encoded signal at a first encoding
rate;

generating encoding assistance data comprising scale factor offset data
indicative of an association between at least one scale factor associated with the first
encoding rate and at least one scale factor associated with a second encoding rate different
30 than the first encoding rate; and

re-encoding the signal or the pre-encoded signal at the second encoding rate in
response to the scale factor offset data of the encoding assistance data.

- 27. A computer program enabling the carrying out of a method according to claim 22 or claim 26.**
- 28. A record carrier comprising a computer program as claimed in claim 27.**